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ABSTRACT

The project sought to clarify the nature and structure of adaptive functioning and to address methodological issues in its assessment, in order to improve placement, evaluation, and instructional decision-making related to adaptive functioning. Project components included: (1) exploration of the structure of adaptive behavior; (2) comparison of adaptive functioning performance as a function of level of disability; (3) comparison of adaptive functioning performance as a function of level of educational service placement; (4) exploration of the effects of evaluator characteristics and evaluation format on adaptive functioning assessment; (5) exploration of the influence of environmental context and opportunity on adaptive functioning; and (6) exploration of the relationship between observed behaviors in natural environments and adaptive functioning assessment. For each component, this report provides a literature review and summarizes the results of several empirical investigations carried out by the project. A list of project reports, articles, presentations, and personnel is included. (JDD)

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Final Report

Grant Number: GOO8430084

Assessing and Developing the Adaptive Functioning of Handicapped Children and Youth

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ABSTRACT

In the three year period from October, 1984 to September, 1987, the United States Department of Education funded a project grant on "Assessing and Developing the Adaptive Functioning of Handicapped Children and Youth. The primary research aim of this project was to clarify the nature and structure of adaptive functioning and to address methodological issues in the assessment of adaptive functioning. The components of this project included (1) exploration of the structure of adaptive behavior, (2) comparison of adaptive functioning performance as a function of level of disability, (3) comparison of adaptive functioning performance as a function of level of educational service placement, (4) exploration of the effects of evaluator characteristics and evaluation format on adaptive functioning assessment (5) exploration of the influence of environmental context and opportunity on adaptive functioning and (6) exploration of the relationship between observed behaviors in natural environments and adaptive functioning assessment.

Extensive developmental, data collection and analysis activities were completed as part of the "Adaptive Behavior" project. This report includes summary information about the project in terms of objectives, major activities and findings, and products resulting from project activities.

INTRODUCTION

Adaptive functioning, the extent to which an individual takes care of personal needs, exhibits social competence, and refrains from engaging in problem behaviors, has received increasing attention over the past two decades. Adaptive behavior is a construct appears to be firmly embedded in contemporary definition and classification systems in mental retardation. As a concept, adaptive behavior has historical roots in the early development of definitional and service systems. In 1959, the concept of "adaptive behavior" was formally included in the definition of mental retardation (Heber, 1961). Subsequent revisions of the AAMD Manual (Grossman, 1973, 1977) continued to include the adaptive behavior component in the definition. In the most recent AAMD definition of mental retardation (Grossman, 1983), adaptive behavior is set forth as one of the essential conditions for the diagnosis of mental retardation. Impairments in adaptive behavior are defined as "significant limitations in an individual's effectiveness in meeting the standards of maturation, learning, personal independence, and/or social responsibility that are expected for his or her age level and cultural group" (Grossman, 1983, p. 11). Mention of adaptive behavior, by definition and standards of assessment, has been also more recently referenced in several important federal laws governing disability programs and in special education and human service regulations of most states (Coulter & Morrow, 1978).

The concepts of "adaptive behavior" and "mental retardation" have been intertwined in meaning and use throughout most of the history of special education and other services to people with disabilities (Kanner, 1964; Scheerenberger, 1983). Although initial conceptions and definitions of "mental retardation" relied heavily on the concepts of intelligence and ability to learn, actual adjustment difficulties experienced by individuals, in one environment or another, were never completely eliminated from consideration.

Despite continuing evolution of the terminology and definitional criteria related to mental retardation, the emphasis given to adaptive behavior difficulties has continued to increase, at least within the United States (Clarke & Clarke, 1974; Holman & Bruininks, 1985; Meyers, Nihira & Zetlin, 1979).

There have been many efforts to more precisely define the dimensions of adaptive behavior (Greenspan, 1979; Holman & Bruininks, 1985; Meyers et al., 1979). "Adaptive functioning" from a broad perspective includes the two primary categories of behaviors, adaptive behavior and problem behavior. Concern about problem behavior arose as mentally retarded individuals were increasingly moved into and rehabilitated in community settings (cf. Hill & Bruininks, 1984; Meyers, Nihira & Zetlin, 1979). The inclusion of problem behavior is supported by the recognition demonstrated predictive relationships to later problems and adjustment (cf. Meyers et al., 1979; Morreau, 1985; Windle, 1962). Behavior problems have been recognized for many years as primary impediments to school and community adjustment and as a chief cause for placement of handicapped individuals outside the natural or adopted family (Bruininks, 1982; Eyman & Borthwick, 1980; Eyman, Borthwick & Miller, 1981; Hill, Bruininks & Lakin, 1983; McCarver & Craig, 1974; Morreau, 1985; Sternlicht & Deutsch, 1972; Windle, 1962). Evidence from these studies indicates that maladaptive behaviors among mentally retarded people are strongly related to life outcomes such as (1) initial out-of-home placement and reinstitutionalization; (2) failure in community placements and readmission to supervised residential placements; (3) increased probability of transmitting certain diseases and health problems; (4) reduced opportunity for social integration and leisure in community settings; and (5) reduced prospects for employment. There is often an unfortunate tendency to ignore the close relationship that exists between the acquisition of skills classified as adaptive behaviors and those that are considered maladaptive in normal environments.

Despite the recognition of the importance of adaptive functioning and its inclusion in definitions of mental retardation, the utility of the concept for diagnosis and placement, eligibility determination, program planning, program evaluation and management, and even population description has been limited. This is due to problems related to definitional and conceptual issues, methodological issues, serious technical deficiencies in most instruments, and implementation issues in assessment (Holman & Bruininks, 1985).

The concept of adaptive behavior and the use of adaptive behavior measures have generated lively debate and criticism during the past 25 years. Clausen (1972) argued nearly 15 years ago that the construct of adaptive behavior was ill defined and lacked sufficient reliability for purposes of definition, classification, and scientific research. Considerable research and some theoretical development have produced clearer and more functional definitions of adaptive behavior (Holman & Bruininks, 1985; Meyers et al., 1979). Despite such recent gains, one of the most crucial needs today is still the development of sound theories and models to guide future research and practice. More recent developments in this area seem to stress important interactive aspects of components of personal competence (Greenspan, 1979), relationships between adaptive and maladaptive behaviors in defining competence within environments, and the essential importance of environmental considerations in assessing and interpreting adaptive functioning of individuals. This broadening of the concept of adaptive behavior in relation to features of environments is also reflected in more recently developed and improved standardized assessment measures (Holman & Bruininks, 1985).

The utility of adaptive behavior assessments reaches beyond the decisions of definition, classification, and service eligibility. Application of the construct of adaptive

behavior also contains considerable potential for improving assessment, service planning, and intervention practices. With sound practices, for example, such measures can provide important tools for improving the involvement of parents and others knowledgeable about the functioning of individuals in natural environments.

The construct of adaptive behavior is now defined more clearly than when it was first introduced s part of the definition of mental retardation. Still, one of the most crucial needs has been the development of a comprehensive model of adaptive functioning--a theoretical formulation to guide future research and development efforts. As Keogh (1981) noted, the definitions and meanings of terms used to denote social competence are not well understood: "Definitions abound and specifics vary relative to age of the individual and to situational demands" (p. 209). The studies undertaken in this project addressed improvements in conceptual models that incorporate all aspects of individuals adaptation into a meaningful theoretical structure and focus upon the total growth, development, and functioning of the individual, throughout the life cycle.

This project represented an attempt to address many of the major problems that exist in current practice for assessing and developing the adaptive functioning of handicapped children and youth. Its primary aim was to clarify the nature and structure of adaptive functioning and to address methodological issues in the assessment of adaptive functioning. In doing so, the project is of potential help to practitioners in making appropriate, data-based, placement, program planning, and training decisions to increase integration and adaptation of handicapped individuals into least restrictive settings.

Research Objectives

A series of studies relative to assessing and developing the adaptive functioning of handicapped children and youth were designed and implemented as part of this project. The studies addressed the following procedural objectives:

1. To examine the structure of adaptive functioning (adaptive behavior and problem behavior) through the use of specific multivariate statistical procedures.
2. To compare the adaptive functioning performance of handicapped individuals as a function of level of disability.
3. To assess the usefulness of adaptive functioning measures, in combination with academic and aptitude measures, in predicting level of educational service.
4. To examine the influence of the type of evaluator (father, mother, teacher, etc.), evaluation format (interview, paper and pencil), or environmental context (home, school, work, etc.) on adaptive functioning scores.
5. To study the relationship between ratings of adaptive functioning and the observation of specific adaptive behavior and problem behavior in natural settings.
6. To examine the impact of involving parents and other caregivers in assessment and eliciting training objectives on their participation in IEP meetings and the content of developed plans.

The comprehensive set of studies and developmental efforts in this project has provided increased understanding of the construct of adaptive functioning and implications for improving placement, evaluation, and instructional decision making related to adaptive functioning. The results of this research should aid in reducing some of the

current conceptual ambiguity surrounding the adaptive functioning construct. Ultimately, this improved knowledge and understanding should lead to more effective decision making and practices related to the integration of handicapped children and youth into least restrictive settings.

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THE DIMENSIONS OF ADAPTIVE BEHAVIOR

Background

Despite the increased focus on adaptive behavior in the assessment of individuals with handicaps, problems have hindered utilization of the construct. Central to these problems is the fact that no unified notion of the adaptive behavior construct has been established (Holman & Bruininks, 1985; Witt & Martens, 1984). Many fundamental questions regarding the dimensions of this construct remain unanswered (Keith, Fehrmann, Harrison, & Pottebaum, 1987). It is clear there is a crucial need to develop a comprehensive model of adaptive functioning--a theoretical formulation to guide future research and development efforts. In this project adaptive functioning was defined to include both the dimensions of personal independence (i.e., adaptive behavior) and problem behaviors (i.e., maladaptive behavior).

The most comprehensive contemporary attempt to elucidate the construct of adaptive behavior was Meyers, Nihira, and Zetlin's (1979) review of the adaptive behavior measurement literature from 1965 to 1979. Their extensive review of factor analytic studies revealed that adaptive behavior, as defined by available assessment instruments, is a two dimensional structure. Meyers et al. (1979) noted that across studies with different instruments and samples, a consistent autonomy dimension was present (labeled "functional autonomy," "self-sufficiency," or "independence" by various researchers). The second factor identified across studies was interpreted as a responsibility dimension. When the maladaptive behavior domain was included in the studies reviewed, Meyers et al. (1979) reported a consistent two-factor maladaptive structure. The two factors were interpreted to represent the extra-intra dimensions (e.g., extrapunitive-intrapunitive, extraversion-intraversion) frequently used to describe personal adjustment.

Most reported studies on the structure of adaptive behavior employed a single instrument, the AAMD Adaptive Behavior Scale, (Lambert, Windmiller, & Cole, 1975; Nihira, Foster, Shellhaas, & Leland, 1969) and samples of individuals with mental retardation living primarily within institutionalized settings (Meyers et al., 1979; Holman & Bruininks, 1985). In recent years, a number of instruments has been developed and standardized with nonretarded norming samples (Bruininks, Thurlow & Gilman, 1987). Little research is available on the factor structure of adaptive behavior scales using more recently developed instruments or using samples with a broader range of characteristics and living environments. Expansion of studies with other instruments and samples was needed to assess the consistency of previously reported factors and dimensions of adaptive behavior. Furthermore, the usefulness of measures of maladaptive behavior was an area in need of significant research.

Procedures

The current study investigated the nature of adaptive behavior through six separate, but related, research investigations. Investigation I examined the structure of adaptive behavior as a function of age, developmental level, and type of handicap through exploratory factor analysis of both the individual items and subscales of a comprehensive, contemporary, nationally standardized measure of adaptive and maladaptive behavior, the Scales of Independent Behavior (Bruininks, Woodcock, Weatherman & Hill, 1984). Investigation II also explored the structure of adaptive behavior by extending the factor analytic review of Meyers et al. (1979) through use of formal quantitative research synthesis procedures with available factor analytic studies of adaptive behavior instruments. Investigation III explored the relationship between adaptive behavior, maladaptive behavior, and intellectual/academic ability through the application of multivariate statistical methodology (viz., factor, cluster, and canonical correlation

analyses) in three samples that had been administered one of two contemporary co-normed adaptive behavior/intellectual assessment batteries (viz., Scales of Independent Behavior [Bruininks, et al., 1984] and Woodcock-Johnson Tests of Cognitive Ability [Woodcock & Johnson, 1977]; Vineland Adaptive Behavior Scale [Sparrow, Balla & Cicchetti, 1984] and Kaufman Assessment Battery for Children [Kaufman & Kaufman, 1983]). Investigations IV, V and VI explored the nature of maladaptive or problem behavior. Investigations IV and V explored the base rate of specific problem behaviors, as well as differences in problem behavior prevalence rates as a function of age and gender, in a large nationally representative sample (i.e., the Scales of Independent Behavior norming sample). Finally, Investigation VI explored the extent to which the frequency and severity dimensions of problem behavior differentiated nonhandicapped and behavior disordered populations. The combined purpose of Investigations IV, V and VI was to evaluate the usefulness of the problem behavior (i.e., maladaptive behavior) construct in assessing an important dimensions of personal competence.

Conclusions

These series of investigations explored a number of important conceptual and methodological issues in defining the construct of adaptive behavior. The following major conclusions were extracted across these research investigations.

1. Adaptive behavior appears to be a unique construct with minimal overlap or redundancy with the construct of intellectual and academic ability. Thus, adaptive and maladaptive behavior scales add important information to intelligence and achievement tests in assessing personal competence.

2. The structure of adaptive behavior, as measured by available measurement scales, appears best represented by one to two dimensions. These is consistent evidence across scales and populations for the presence of a large general adaptive behavior factor. The consistency of research findings breaks down when one moves beyond this large general adaptive behavior factor. Although evidence does exist for the presence of a second, and in some cases a third factor, this dimension is relatively small and appears to vary with adaptive behavior scales and the development characteristics of samples. A variety of secondary dimensions have been identified which include social responsibility, academic, physical developmental, and community-vocational functioning.

3. When the structure of adaptive behavior has been systematically studied with the same scale across the entire life span, as well as in retarded and nonretarded samples possible developmental differences in the construct of adaptive behavior are suggested. A more multidimensional representation of adaptive behavior at the preschool and adult age ranges, with a unidimensional structure during the school-aged years, suggests possible developmental and/or differential environmental influences in the development of adaptive behavior.

4. Exploration of the nature of the adaptive behavior construct requires researchers to be cognizant of a number of significant methodological issues. First, the interpretation of factor analysis of adaptive behavior scale items can be confounded by item "difficulty" factors. Second, the number of adaptive behavior factors identified by different researchers appears to be systematically related to the

level of measurement detail (i.e., whether one is analyzing individual items, item parcels, or subscales). Because of the number of problems inherent in item-based factor analytic research (e.g., difficulty factors, reliability of items), which appears to have been largely ignored in most of the research, it is concluded that subscale level research currently provides the most solid base from which to evaluate the theoretical structure of adaptive behavior.

5. The construct of maladaptive behavior has been studied less extensively than adaptive behavior. The extant literature suggests that maladaptive behavior, as measured by available measurement scales, is primarily a two-dimensional construct. Social (externally directed) and personal (internally directed) maladaptive dimensions have been identified in the literature.

6. Research provides important support for a number of components of Greenspan's (1979) model of personal competence. Available factor analytic research studies support the conceptualization of adaptive intelligence as having a substructure of conceptual (i.e., intellectual/academic ability) and practical (i.e., adaptive behavior) intelligence. A separate socioemotional adaptation dimension (i.e., maladaptive behavior) is also supported by the available research. in contrast, as measured by available scales, minimal or no evidence exists to support the presence of separate physical competence and social intelligence dimensions. The degree of correspondence between the research and Greenspan's model reinforces attempts to utilize theoretical models in research efforts on human competence, as well as points out limited coverage of selected areas in currently

available intelligence, achievement and adaptive behavior measurement scales.

7. The evaluation of problem or maladaptive behavior must take into consideration basic prevalence and base rate information. In nationally representative samples, certain behaviors are found to be more prevalent at certain ages (i.e., highest rates between ages 2-11). In contrast, no significant gender differences are suggested in specific problem behaviors at different ages. Although problem behaviors are found in normal samples, it is the severity (not frequency) of behaviors which most clearly differentiates individuals with significant problem or maladaptive behaviors from the normal population. The assessment of both frequency and severity of problem or maladaptive behavior is needed to provide a comprehensive picture of this important dimension of personal competence.

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THE DIFFERENTIAL DIAGNOSTIC CAPABILITIES OF ADAPTIVE BEHAVIOR SCALES

Background

The construct of adaptive behavior has had multidimensional application within the field of mental retardation during the past two decades (Holman & Bruininks, 1985). Adaptive behavior is defined as the "effectiveness or degree with which individuals meet the standards of personal independence and social responsibility expected for age and cultural group" (Grossman, 1983, p. 1). Multidisciplinary specialists working with mentally retarded clients in a variety of educational, residential and habilitative settings have increasingly applied this construct to specify client eligibility standards for special programs and services, to design intervention programs and prescribe individualized client treatment plans, to evaluate programs and justify resource allocations and to make decisions regarding client discharge or program exit criteria (Coulter & Morrow, 1978; Schalock, 1985).

The impact of the adaptive behavior construct has been especially significant with regard to definitional and classification concerns affecting mentally retarded persons (Cantrell, 1982); Huberty, Koller & Ten Brink, 1980). Since the role and function of adaptive behavior was elevated to a significant degree within the 1961 and 1973 definitions of mental retardation advanced by the American Association on Mental Deficiency (AAMD) (Grossman, 1983), procedural issues regarding classification practices and concomitant placement decisions of retarded persons have come under increased scrutiny. One salient issue in this regard concerns the specific use of the criterion of adaptive behavior in the process of differential diagnosis and program placement (Childs, 1982; Roszkowski & Spreat, 1981; Spreat, 1980).

Despite traditional criticisms of adaptive behavior as a valid criterion for diagnosing mental retardation (Futterman & Arndt, 1983; Smith & Polloway, 1979), in contrast to exclusive use of standardized intelligence scales (Clausen, 1972), the legitimacy and acceptability of adaptive behavior as a differential diagnostic criterion have improved considerably during the past decade (Holman & Bruininks, 1985). For example, adaptive behavior assessment data are referenced as essential evaluation measures in most federal legislation affecting handicapped citizens, including Public Law 94-142, and in most state statutes and regulations. Nevertheless, despite its recognized diagnostic importance, the construct of adaptive behavior has not been subjected to extensive research.

While limited knowledge of the psychometric properties of adaptive behavior scales may generally have a positive influence upon the application of differential diagnostic processes, unresolved issues emanate from factor analytic research (see "The dimensions of adaptive behavior" section of this report) concerning appropriate diagnostic criteria for differential placement in special education programs and classrooms. A practical need existed to investigate the predictive properties of adaptive behavior scales in reliably distinguishing individuals by group classification for purposes of accurate placement and appropriate delivery of special education services.

Procedures

Two investigations were conducted which evaluated the diagnostic capabilities of a nationally standardized measure of adaptive behavior. Investigation I examined the extent to which the adaptive and problem behavior indexes of the Scales of Independent Behavior (SIB: Bruininks, Woodcock, Weatherman & Hill, 1985) predicted the level of program placement and education service received by handicapped and nonhandicapped students. This investigation included 199 nonhandicapped and handicapped subjects with

a variety of handicapping conditions(i.e., behavior disordered, learning disabled, mentally retarded) who were placed in regular educational environments or settings ranging from part to full-time. Multiple discriminant function analyses was used to classify students into one of four categories (extent of mainstreaming) based on the linear statistical weighting of SIB adaptive and problem behavior indexes. Investigation II examined the extent to which the SIB adaptive and problem behavior indexes could differentially predict intellectual level, as defined by school placement. SIB data from subjects (n=479) classified as moderately retarded (TMR), mildly retarded (EMR), or nonretarded were included in a multiple discriminant function analysis. Analyses based on adaptive and/or the combination of adaptive/maladaptive indexes were completed.

Conclusions

The results from both investigations provided strong evidence for the use of adaptive and maladaptive scales in the differential diagnosis and placement decisions. In Investigation I two significant discriminant functions were found that significantly predicted the level of mainstreaming for categories of school placement. The linear combination of adaptive and maladaptive variables were found to account for a large degree of the variance in level of service. Using the two significant functions that were extracted, 68% of the subjects were correctly classified according to their level of special education service. When compared to a chance level of 25%, the combined use of adaptive and maladaptive variables were found to significantly improve in the correct classification of individuals according to level of special education service. Highly significant results were also found in the second investigation. Investigation II found that the linear combination of SIB scores accounted for a significant portion of the variance between different intellectual groups, and correctly classified 76% of the subjects by group membership. The combined results of both investigations support the

use of measures of adaptive and maladaptive behavior (in this case as measured by the SIB) as significant contributors to the process of differential diagnosis and classification, and service needs determination.

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THE INFLUENCE OF EVALUATOR CHARACTERISTICS ON MEASURES OF ADAPTIVE FUNCTIONING

Background

Some preliminary research conducted by Bruininks and colleagues (cf. Bruininks, Woodcock, Hill, & Weatherman, 1984) demonstrated that teachers, classroom aides and parents produce systematic differences in the evaluation of adaptive functioning of handicapped and nonhandicapped children and youth. This possibility needed further exploration. These studies investigated the effects of rate on the adaptive functioning of students with handicaps.

Many instruments have been developed to assess adaptive and problem behaviors (Holman & Bruininks, 1985). Most instruments recommend that they be completed by someone knowledgeable about the child, usually the parent or the classroom teacher. Rarely is it recommended that both the teacher and the parents be involved in the assessment process. Yet, ratings of adaptive and problem behaviors by parents and teachers have generally been found to be quite discrepant.

Regardless of the scale used or the characteristics of the subjects involved, investigations have quite consistently shown that parents rate their children differently than do teachers (Blair, 1970; Gutsch & Casse, 1970; Kaplan & Altishe, 1976; Mealor & Richmond, 1980; Stedman, Clifford, & Spitzmagel, 1969; Wall & Paradise, 1981; Zuk, 1959). In all cases, the ratings given by parents were higher than those given by teachers. In most studies, the subjects being rated were handicapped or disadvantaged preschool and elementary school students. However, results have been similar for adolescent (Mealor & Richmond, 1980) and adult mentally retarded people and nonhandicapped preschool children (Kaplan & Altishe, 1976; Wall & Paradise, 1981).

With most of the assessment instruments used in these investigations, however, the technical development was less than adequate (Holman & Bruininks, 1985). Norms were generally developed on populations that were not representative of the nation as a whole, so the generalizability of the results to the subjects of the studies has been questionable. Moreover, reliability and validity studies, when conducted, have frequently yielded results that are less than desirable. Few scales provide interrater reliability data comparing ratings of two people in the same environment who are equally familiar with the subject. This information is critical in evaluating the differences between raters, such as parents and teachers, who observe the child in two different environments. Unless interrater reliability is quite high, it is impossible to ascertain whether the obtained differences were due to differences in ratings across environments or due to measurement error.

When problem behaviors are the focus of rating comparisons between parents and teachers, the results are similar. Levels of agreement between parent and teachers are generally quite low (Becker, 1960; Gilkey, 1972; Miller, 1964; Mitchell & Shepherd, 1966; Quay, Sprague, Shulman, & Miller, 1966; Touliatos & Lindhold, 1981). In most cases, parents perceive more problems in their children than do teachers. To an even greater extent than is true with adaptive behavior scales, the technical development of the problem behavior scales used in these investigations was inadequate. The studies of parent-teacher ratings of problem behavior were frequently conducted as a part of the technical development of a new instrument, when interrater agreement of raters in single environments or observing the same interview had not yet been established.

The purpose of these studies was to compare the ratings of adaptive and problem behaviors given to handicapped and nonhandicapped elementary-age children by their teachers, parents, and classroom aides. Three research strands were investigated: Investigation I compared ratings between parents and teachers, Investigation II compared ratings between fathers and mothers and Investigation III compared ratings between teachers and teachers aides.

Investigation I: Parents and Teachers

Subjects in Investigation I were the parents and teachers of 37 handicapped and 37 nonhandicapped students. Selection of subjects was based on the availability of both parent and teacher interviews and the availability of handicapped and nonhandicapped subjects who were close in age. Subjects ranged in age from 94-139 months at the time of testing, with a mean age of 9 years, 8 months. Handicapped children were paired with respect to chronological age and gender with nonhandicapped peers. Paired subjects were an average of three months different in age, and 61.2% of the handicapped and nonhandicapped children were matched on gender. Of the handicapped students, five had been classified by their school districts as learning disabled, eight were considered emotionally disturbed, twelve were labeled educable mentally retarded, and twelve were trainable mentally retarded. The majority of the subjects were White (78.4%); 17.6% were Black; 1.4% were American Indian; and 2.7% were Asian/Pacific Islander.

Procedures

The Scales of Independent Behavior (SIB) (Bruininks, et al., 1984) was selected for this investigation since it is designed to be administered in a structured interview format to either parents or teachers. Both parents and teachers were interviewed about the adaptive and problem behaviors of a child using the standardized procedures outlined in the Interviewer's Manual of the SIB. The SIB was administered to the parent and the teacher, generally by the same interviewer, no more than one month apart ($\bar{x}$ = 11 days apart).

Conclusions

Scores given handicapped children were significantly lower than those of their nonhandicapped peers for all indexes of adaptive and problem behavior ($p < .001$). In all clusters and in Broad Independence, parents rated their children higher than did teachers. The differences reached levels of statistical significance in Broad Independence, and in the Community Living Skills, and Social Interaction and Communication Skills clusters.

To further analyze the differences, the subscale scores within the Community Living Skills and Social Interaction and Communication Skills clusters were evaluated. Within the two clusters, differences were attributable to a small number of subscales. Samples used in this series of studies included 31 nonhandicapped elementary school children between the ages of 6 and 8 years (mean = 92.84, SD = 12.30 months), 39 handicapped students (27 severely to mildly retarded, 6 learning disabled, and 9 behavior disordered) between 7 and 11 years of age (mean = 116,41, SD = 12.66 months), 25 moderately retarded adolescents and young adults (mean = 345.00, SD = 121.06 months), and 26 moderately to severely retarded subjects (17 males, 9 females) between 15 and 21 years of age (mean = 18.39, SD = 1.79 years). Parent and teacher interviews were conducted within a 3- to 4-week period.

The mean SIB scores for the nonhandicapped elementary school age children obtained from parents and teachers were similar. Correlations between the scores of the two types of respondents were moderate, with coefficients of .64 for Broad Independence scores, and coefficients ranging from .41 to .68 for the other SIB cluster scores. The results obtained from the sample of moderately and mildly retarded students, ages 7 to 11 years, were similar for parents and teachers. Correlations between parents and teachers were considerably higher than those derived for nonhandicapped students. A correlation of .84 was found for the Broad Independence scores, while the other SIB cluster scores

fell mostly in the .80s (range of .72 to .88). The results for the sample of moderately and mildly retarded students, ages 13 to young adult, again, were highly similar. The correlation was .76 between their Broad Independence scores, with the other SIB cluster score correlations ranging from .67 to .82. The results for the sample of moderately to severely retarded subjects between 15 and 21 years old differed between parents and teachers more than for the other handicapped samples, with parents consistently producing higher average scores. The sample correlations were higher for this sample, however, than for the other groups (e.g., r = .86 for Broad Independence scores).

These comparisons between parent and teacher evaluations provide important insights on differences in reports about a subject's capabilities as perceived by different respondents and in different settings. Parents generally rated their children higher in adaptive behavior skills than did teachers. The results indicate relatively high agreement among the evaluations of parents and teachers of handicapped children, with less agreement between these respondents for a sample of nonhandicapped children. This difference in level of agreement between the samples could be influenced by greater variability in the scores of handicapped subjects and differences in the perception of parents and teachers regarding their adaptive behavior skills. Although the handicapped and nonhandicapped samples were not closely matched on chronological age and other important characteristics, parent and teacher perceptions of handicapped children appear to be similar. This agreement may reflect a greater consensus between parents and special education teachers regarding the development and skills of handicapped children compared to parents' and regular classroom teachers' assessment of nonhandicapped children. These results may also reflect more extreme variability of scores in the handicapped sample. The interpretation of differences in parental perception of handicapped students is supported by results of a study by Etscheidt et al. (1984) on the objectives generated by parents and teachers. Thus, parents of handicapped children

generated significantly more objectives on the SIB than did parents of nonhandicapped children. Of the objectives for improvement generated by parents, those for handicapped children were more specific and focused more on developmental skills in adaptive behavior.

Investigation II: Mothers and Fathers

Subjects in Investigation II were mothers and fathers. Current legislation assures parents participation in their child's special education program; however, this participation has been documented as minimal in many instances. By utilizing parents as respondents on measures of adaptive behavior, it is assumed that their participation and contributions will be increased in special education programs. As adaptive behavior measures are increasingly used as assessment tools, information regarding rater perspective will gain importance. Since mothers, fathers, and teachers will most likely be the three respondents most utilized for assessing adaptive behaviors, information regarding any differences in perspective among these respondents will be of value. The purpose of this study was to determine the extent to which mothers and fathers agree on the adaptive behavior skills, problem behaviors, and adaptive living educational program objectives for handicapped children and youth.

The need for increased parent participation and greater social validity for curriculum practices in special education can be construed as complimentary concerns in special education. Bruininks and others have argued that parents are more likely to contribute as active rather than passive partners in the IEP process if they contribute specific information related to socially valid learning needs of their children (Bruininks, Lakin & Hill, 1986). For many handicapped students, the most compelling learning needs

are concerned with the development of essential personal and community independence skills (Schalock & Harper, 1978; Rotegard, Bruininks, Holman & Lakin, 1985). These skills are often defined as comprising critical aspects of the construct of adaptive behavior. Unfortunately, little research has been conducted using parents to assess the adaptive behavior skills of children or to assess the objectives they feel need instructional emphasis within the domain of personal and community independence skills within special education and other training programs.

A large majority of available adaptive behavior instruments employ a third party respondent to gather information on an individual's skills (Holman & Bruininks, 1985; Mealer & Richmond, 1980). Advantages to utilizing a parent as an informant include benefits from parental involvement and increased ecological validity (Stancin, Reuter, Dunn & Bickett, 1984). The use of an informant, however, inherently involves the possibility of rater bias (Mealer & Richmond, 1980), differences in perspective or even different effects of environment of behavioral functioning. Other possible problems may include ambiguity of items and halo effects (Irvin, Crowell & Bellamy, 1979). Thus using a respondent as a source of information may present certain disadvantages; however, these seem minimal compared to the potential benefits.

Several studies have examined the accuracy of parent observations and parent estimations of skill levels of their children. This research has typically been conducted using one of two designs. First, research in this area has focused on comparisons between parent ratings (generally mothers) and teacher ratings (Beckman, 1984; Hanson, Vail & Irvin, 1979; Kaplan & Alatishe, 1976; Mealer & Richmond, 1980; Sexton, Miller & Rotatori, 1985; Stancin, et al., 1984). Next, studies have examined the extent to which parental estimates of development of intelligence are congruent with the child's

performance on standardized test items (Capobianco & Knox, 1964; Ewert & Green, 1957; Hunt & Paraskevopoulos, 1980; Schulman & Stern, 1959).

A number of studies have concluded parents can be accurate observers of their child's behavior (Beckman, 1984; Hanson, et al., 1979; Sexton, et al., 1985; Stancin, et al., 1984). Additionally parent information provided on questionnaires has produced high correlations with infant development measured by standardized tests (Knobloch, Stevens, Malone, Ellison & Rosemberg, 1984). Parent observations have also proven successful in predicting the child's reading ability (Colligan, 1976). Thus, information has accumulated supporting the value of parental observations and evaluations of their child's development and performance.

Some research also indicated that mothers tend to overestimate the child's developmental level as compared with actual test performance (Capobianco & Knox, 1964; Hunt & Paraskevopoulos, 1980, Mealer & Richmond, 1980) or teacher ratings of the child (Stancin, et al., 1984). Moreover, in one study mothers were found to provide higher estimates of the child's ability to perform specific cognitive tasks than fathers (Capobianco & Knox, 1964). Hence, limited data do suggest some degree of discrepancy in parental perspective regarding the child's development, compared to various outside standards. However, nearly all such studies involved cognitive and academic achievement measures, areas in which parents may be at significant disadvantage in evaluating their child's behavior and performance. In these studies parents are required to provide information regarding the child's development without the benefits afforded professionals through familiarity with assessment instruments (Beckman, 1984).

Information provided by parents on adaptive behavior instruments presents a

somewhat different situation. Adaptive behavior instruments assess skills performed in environments in which parents have had extensive opportunity for observation (Mealer & Richmond, 1980; Harrison, 1985) giving them the advantage of information base.

Comparing the information provided by mothers and fathers regarding adaptive behaviors is important in specifying areas of disagreement (Sexton, et al., 1985) that may be important factors in communication and instructional planning. Mothers and fathers see the child in the same environment and have equal opportunity for observation of the measured adaptive behavior. Since most of the research conducted thus far has compared only the mothers' observations with those of teachers, a comparison of mothers and fathers ratings on standardized adaptive behavior measures would add significantly to current knowledge. As adaptive behavior measures are increasingly used as assessment tools, information regarding rater perspective will gain importance.

Fathers have rarely been involved in studies of parental observation accuracy. A recent study (Sexton, et al., 1985) examined the congruency between mothers and diagnosticians and fathers and diagnosticians regarding the developmental status of their handicapped child; however, a direct comparison of information provided by mothers and fathers was not included.

Mothers are reported as significantly more involved in the child's special education program. (Cone, Delawyer & Wolfe, 1985). Enlisting the father's involvement in the assessment procedure may serve to increase later participation in the child's program. Moreover, research has also shown that when both parents attend the child's IEP meetings at school, parent contributions increase (Turnbull & Turnbull, 1986). Thus, increasing father participation may result in greater participation by both parents throughout the process.

Thus, several critical issues regarding parent contributions and parent perspectives need to be empirically addressed. Increased parent participation and greater social validity for curriculum practices are viewed as important objectives within the field of special education. The assessment of adaptive behavior skills using parents as respondents should their increase participation in the evaluation process and should allow program planning to include daily living skills crucial for successful independent functioning.

To maximize the participation and contributions of parents, information is needed regarding the agreement among them on measures of adaptive behavior. Furthermore, information concerning the value of student or parent variables in predicting level of congruency among respondents may help identify parents who may need additional training or experience, prior to serving as respondents may help identify parents who may need additional training or experience, prior to serving as respondents, so that information will be accurate and reliable (Sexton, et al., 1985).

Investigation II addressed the following objectives:

1. To compare the information and level of agreement among mothers and fathers concerning the handicapped child's personal independence and community independence skills.
2. To compare the information provided by mothers and fathers concerning the handicapped child's personal independence and community independence skills as a function of the child's sex, as a function of the child's age, and as a function of the interaction between the child's age and sex.

3. To determine if parent characteristics (level of income, education of mothers, and education of fathers) or child characteristics (age, sex and handicapping condition) are predictive of level of agreement among mothers and fathers.
4. To compare the number, content, and degree of specificity of the objectives provided by mothers and fathers concerning their handicapped child's personal and community independence skills.
5. To compare the number, content, and degree of specificity of the objectives provided by mothers and fathers concerning the handicapped child's personal and community independence skills.

Procedures

Subjects included 31 families from the Minneapolis/St. Paul area in Minnesota and 14 families from Kentucky providing mother and father ratings on 45 children with handicaps.

The sample of rated children included 21 who were between the ages of birth to 12 years and 24 children who were over age 13. The disabling conditions represented included 34 with learning disabilities, 6 with mild mental retardation, 6 with moderate mental retardation, 12 with severe mental retardation, 2 with visual impairments, and 2 with hearing impairments. The parents who rated their children ranged in age form 24 to 61 and were representative of a full range of income and educational levels.

For each child, an interview was completed by his or her mother and father. The Scales of Independent Behavior (SIB) (Bruininks, et al., 1984) was individually administered to each parent by a trained interviewer. Interviews were conducted

separately and completed within a two to three week time period. Upon completion of each adaptive behavior subscale of the SIB, parents were encouraged to identify objectives within the need of emphasis within the child's educational program. Parents were also asked to indicate specific problem behaviors within each of the 8 SIB problem behavior domains, as well as their frequency, severity, and the action usually taken by others in response to those behaviors.

Conclusions

Scores for data analysis included the SIB adaptive behavior subscale scores, cluster scores, and broad independence score, and the problem behavior profile. Information provided by mothers and fathers regarding their child's adaptive behavior functioning will be compared using a three way analysis of variance with repeated measures. Significant differences on subscale scores, cluster scores, broad independence scores, or problem behavior scores will be used to identify any discrepancies in the perspectives and evaluations of mothers and fathers. This analysis will also indicate if the information provided by mothers and fathers differs as a function of the sex of the child or as a function of the age of the child through assessing the significance of the interaction between the child's sex and age.

Investigation III: Teachers and Teacher's Aides

The third investigation was conducted using different independent raters who were the teachers and teacher aides of moderately and severely retarded students. The study included pairs of independent evaluations of 39 adolescent students (26 males, 13 females; 12 to 21 years of age, with a mean age of 18.4 years) enrolled in the same special

secondary school for retarded youth. All subjects were classified as moderately, severely, or profoundly retarded based upon school records, tests, and professional judgment. The teachers and aides had both taught and observed the students in the same classroom environment. The tests were self-administered by the teachers and aides during the same week. The study used the SIB as a measure of adaptive functioning.

Correlations between raters ranged from .74 to .86, with a median of .81. The coefficients for the four Maladaptive Behavior Index scores were .81, .69, .74, and .80, respectively, with a median of .77. These results showed reasonably high consistency in the evaluation of adaptive and problem behaviors expressed in the same environment.

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THE RELATIONSHIP BETWEEN RATED AND OBSERVED ADAPTIVE BEHAVIORS

Background

Little information currently exists regarding the relationship between level of adaptive functioning as rated by key informants (i.e., parents, teachers, caregivers) and the actual expression of behavior in natural settings. The precise relationship between adaptive functioning measure and actual behaviors exhibited in various natural settings (e.g., home, school, work, community sites) is one that warrants careful study. One of the important unresolved issues in this area of research is the extent to which environmental context and opportunity influence the adaptive functioning of handicapped children and youth. The purpose of this investigation was to develop observational procedures and explore the relationship between specific rated behaviors, in both dimensions of adaptive functioning, that is, personal independence and problem behaviors and their expression in actual environments. Two distinct research strands were investigated: Investigation I focused on maladaptive behaviors and Investigation II focused on adaptive behaviors in the areas of personal and social competence.

Investigation I: Observations and Ratings of Problem Behaviors

Previous studies comparing the observation of problem behaviors with their assessment on rating scales have primarily focused on populations of subjects diagnosed with emotional/behavioral disorders even though maladaptive behaviors have an impact on the adjustment of individuals with other handicaps, such as mental retardation (Bruininks, Thurlow & Gilman, 1987). Eaves (1982) has suggested that environmental data (from interviews, school records and screening devices) and direct observation are the two

required sources of information for diagnosis of behavior disorders. Gresham (1982) acknowledges direct observation and rating scales as the two primary methods of behavioral assessment. Measures of frequency, rate, duration and intensity of behaviors can be obtained by direct observation. Rating scales assessing problem behaviors, completed by parents or teachers, are useful in classifying children and youth according to broad categories of problems.

Gresham (1983) suggested direct observation and rating scale be used in a multi-faceted approach, that is, using both methods to assess the same area of functioning to provide comprehensive data for classification decisions and recommendations for interventions. Direct observation, however is often difficult to implement due to excessive time demands in the direct observation of behavior and the potentially intrusive nature of observers in the situation. It is therefore of value to determine to what extent and under what circumstances ratings of behaviors correlate with observed behaviors in various environments.

In review of eleven previous studies (Behar, 1977; Bolstad & Johnson, 1977; Blunden, 1974; Campbell, Schleifer, & Weiss, 1978; Khan & Hoge, 1983; Lahey, Green & Forehand, 1980; Lobitz & Johnson, 1975; Reed & Edelbrock, 1983; Skiba & O'Sullivan, 1986) assessing the relationship between behavior rating scales and direct observation of behavior, one or more correlations between scores from observational data and scores from rating scales were significant. The strength of the relationship of these correlations, however, was low to moderate. These studies focused on assessing children who had been referred for hyperactive or other "problem" behaviors or on samples of children who were considered nonhandicapped.

The intent of the current investigation was to examine whether behaviors assessed on a standardized rating measure were valid and reliable in terms of observed behaviors. Since the adjustment of individuals with handicaps such as mental retardation is often affected by the presence of the maladaptive type of adaptive behaviors, the current investigation focused on individuals with mental retardation.

Procedures

A residential school in a community of 60,000 people was selected as the site for this investigation. Seventy residents, ranging in age from pre-school to adulthood (4 years, 3 months to 34 years, 3 months) were assessed on an initial adaptive functioning rating scales. The Scales of Independent Behavior (SIB) (Bruininks, Woodcock, Weatherman & Hill, 1984) was used as it has 8 specific categories for problem behaviors included as part of the overall adaptive functioning assessment. Each initial assessment included frequency and severity ratings of specific behaviors within the eight broad categories of hurtful to self, hurtful to others, destructive to property, disruptive behavior, socially offensive behavior, uncooperative behavior, unusual or repetitive habits and withdrawal or inattentive behavior. Thirty subjects for the observational component of the study were selected at random. The behaviors observed were selected at random from each subjects specific rated behaviors on the initial SIB assessment.

Staff were trained to conduct baseline observations of behavior in life settings. Behaviors were clearly defined and staff were trained to a level of .85 or higher reliability prior to collecting observational data on the subjects in the study.

Conclusions

Subjects were formally observed by trained staff on four to ten different dates within a 2 - 2 1/2 week period to document the occurrence of specific behaviors targeted as problems in the initial SIB assessment. The observations occurred in natural settings including the play yard, dining room, class room, bathroom, gym and recreation room for the residence. Ninety-eight behaviors were recorded which ranged from simple maladaptive to disruptive to destructive behaviors. Of the 98 behaviors, all but 10 of them occurred on one or more occasions during baseline observations. These results support the conclusions that staff perceptions of maladaptive behaviors are accurate predictors of the occurrence of those behaviors and that constructed rating scales are reliable predictors of behavior which occur in environmental contexts. The 90% level of agreement between behaviors rated on the SIB and those that were observed in the environment suggests that measures of adaptive behavior (specifically the maladaptive component of adaptive functioning) can be used to identify appropriate target behaviors for more precise IEP planning.

The 10 behaviors which were never observed directly during the baseline period raised several methodological issues for further investigation. Behaviors such as stealing or playing with distasteful items may not have occurred during the observational period due to the lack of opportunity for the subject to engage in those behaviors. The role of the observers was to record behaviors and not provide opportunities for them to occur. In addition, many behaviors such as throwing objects or scratching people occur in the presence of particular eliciting stimuli which may not have been present in the environment during the observational period. Further analysis of the data and future investigations as a follow-up to this exploratory study will help to determine what factors increase or decrease the probability of problem behaviors occurring across different environments.

Investigation II: Observations and Ratings of Adaptive Behavior

In order to further explore the relationship between rated behaviors and observational data and examine further the process of observation developed in Investigation I, a pilot study was conducted using adaptive skills (i.e., personal independence) rather than maladaptive behaviors as the focus of study.

Procedures

The pilot study was conducted in a resource classroom during a 2 1/2 hour time block when four EMH students were receiving instruction. The school was a middle class suburban elementary school.

A sample of 18 behaviors were selected from the SIB, using the following criteria:

> Behaviors chosen should be directly observable, and not require parent report.
>
> Behaviors chosen should be those behaviors which were likely to be observable in an academic setting without setting up special situations.
>
> Behaviors selected should be behaviors which most but not all EMH students with a mental age of six to seven years would have in their repertoire.

Eighteen behaviors were selected which met the criteria. Social Interaction skills included were: says please and thank you, waits two minutes for a turn in a group activity, and says hello or shakes hands when being introduced. Language Comprehension or Expression skills included were: follows simple spoken directions, follows two-part directions in the right order after they are spoken once, says last name when asked, and prints or writes first and last name correctly without an example. Home/Community

Orientation skills included were: finds toys and objects that are always kept in the same place and finds own way to a specified room. The Fine Motor task included was: turns at least ten pages of a book one at a time. Eating skills included were: holds and drinks from a glass with little spilling, eats solid foods with a spoon with little spilling, eats with a fork by spearing the food and cuts food with a knife if too large. Time and Punctuality skills included were: states the time on a clock with hands to within 15 minutes and to within 1 minute. A work skill task included was: indicates when an assigned chore or task is finished.

Observational data was reported by percent of time the task was done and/or quality of the task on a four point scale ranging from no response to complete mastery. Students were observed by two examiners who were trained in behavioral observation techniques and were familiar with the SIB. Time interval sampling of selected behaviors was done every 10 seconds. A clipboard with an earphone which beeped every 10 seconds was used for the observation.

Conclusions

At the completion of the pilot observations, investigators concluded that the methods used did not provide the information desired. Selected behaviors did not all occur in the natural environment, and the amount of time necessary to observe them is potentially prohibitive and disruptive to the classroom or other natural setting.

In addition, scoring of behaviors often required extensive discussion with the teacher to determine appropriate student responses, as well as an analysis of environmental cues and constraints. This supports the findings in Investigation I where operational definitions of behaviors and training observers to a high level of reliability are important components of observational research.

In subsequent investigations of the relationship between adaptive behavior ratings and observed behaviors, a parallel investigation to the problem behavior study may be beneficial. Behaviors should be selected specific to each child rather than as a group. Behavior scales would be administered for each child, with three mastered and three non-mastered behaviors selected for each child. The children could then be observed in environmental settings with the occurrence of behavior evaluated. The comparison of these observational evaluations with the ratings made on the adaptive behavior scale would then produce information on the reliability of rating assessments to observed adaptive behaviors.

The two pilot investigations have raised similar methodological concerns regarding the selection of behavior to evaluate and the implementation of observational studies. The process of developing the observational procedures has contributed significant information on the mechanics of this type of investigation and reinforced for the researchers the importance of continuing to investigate the circumstances under which specific rated behaviors do occur in various environments.

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PRESENTATIONS/PUBLICATIONS

Vehicles for dissemination of findings form the Adaptive Behavior Project included project reports, published articles and presentations at professional conferences.

Project Reports and Articles

* Bruininks, R. H. & McGrew, K. (1987). Exploring the Structure of Adaptive Behavior (Report Number 87-1). Minneapolis: University of Minnesota, Department of Educational Psychology.

Bruininks, R., & McGrew, K., & Maruyama, G. The structure of adaptive in retarded and nonretarded samples. Manuscript submitted for publication.

Bruininks, R., Thurlow, M., & Gilman, C. (1987). Adaptive behavior and mental retardation. Journal of Special Education, 21, 69-88.

McGrew, K., & Bruininks, R. A quantitative synthesis of factor analytic studies on the structure of adaptive behavior. Manuscript submitted for publication.

* Ilmer, S., Bruininks, R. H., & Hill, B. K. (1987). Discriminant analysis of intellectual ability groups using measures of adaptive behavior. Manuscript submitted for publication.

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Gilman, C. J. (1986, November). Adaptive Behavior Assessment using the Scale of Independent Behavior. Presentation at a workshop on recommended eligibility criteria for students who are mentally handicapped sponsored by the Special Education Section, Minnesota Department of Education. Brooklyn Park, MN.

Presentations

Brockman, K., Bruininks, R. H., & Hill, B. K. (1985, April). Predicting educational service using the Scales of Independent Behavior. Presentation at the National Association of School Psychologists. Las Vegas.

Bruininks, R. H. (1985, June). Level of disability: assessment and educational placement. Paper presented at the Annual Convention of the American Association on Mental Deficiency. Philadelphia.

* Copy included with this final report.

Bruininks, R. H. (1986, May). Assessing the adult adjustment of persons with mental retardation. Paper presented at the 110th Annual Meeting of American Association of Mental Deficiency, Denver.

Bruininks, R. H., Gilman, C. J., & Thurlow, M. L. (1986, September). Post school adjustment of students with mental retardation. Paper presented at the annual meeting of the American Association on Mental Deficiency (Region VIII), Bloomington, MN.

Gilman, C., & Bruininks, R. (1986, April). Implementing transition monitoring procedures at the local level (utilizing adaptive functioning assessments). Paper presented at the 64th annual convention of the Council for Exceptional Children. New Orleans.

McGrew, K. (1986, May). Exploring the structure of adaptive behavior in handicapped and nonhandicapped populations. Research presentation at Phyllis K. Mirkin Lectureship Series in Special Education, University of Minnesota, Minneapolis, MN.

McGrew, K. (1987, May). Exploring the structure of adaptive behavior. Paper presented at the National Association of School Psychologists convention, New Orleans, LA.

* Copy included with this final report.

PERSONNEL

The Adaptive Behavior Research project was directed by Robert H. Bruininks. Dr. Bruininks is professor of educational psychology and director of the University Affiliated Program on Developmental Disabilities at the University of Minnesota. Dr. Bruininks has extensive experience in research, evaluation and administration related to adaptive behavior assessment and the community adjustment of individuals with handicapping conditions. Dr. Bruininks is a developer of two adaptive behavior instruments, the Scales of Independent Behavior and the Inventory for Client and Agency Planning. He had primary responsibility for coordinating the project activities in the Adaptive Behavior Research Project.

Management and support for this project was provided by Bradley Hill, Kevin McGrew and Cheri Gilman. Mr. Hill has extensive experience in translating statistical results into practical information for professionals and lay people and provided support in statistical analysis. Mr. McGrew has experience is factor analysis and contributed to the methodological studies on the structure of adaptive behavior. Ms. Gilman has experience in the use and interpretation of adaptive behavior instruments and provided management of project activities.